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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,241	05/30/2001	Akira Arai	9319A-000220	8821

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EXAMINER

SHEEHAN, JOHN P

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 11/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

2020

Office Action Summary

Application No.

09/870,241

Applicant(s)

ARAI ET AL.

Examiner

John P. Sheehan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10, 13-16 and 30-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 33-37 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 10, 13-16 and 31 is/are rejected.
- 7) ☒ Claim(s) 4, 30 and 32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities:
 - I. In claim 1, line 7, it appears that the word, --of-- should be inserted prior to "grooves". Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 1 to 8, 10, 13 to 16 and 30 to 32 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - I. In claim 1, in the third and the fourth from the last lines, the meaning of the phrase, "each ridge including a plurality of discreet, space apart regions" is not clear. What does this language mean? Does this language mean that the ridges are discontinuous, that is, a series of dashes?

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Toshio et al. (**Toshio**, Japanese Patent Document No. 09-271909, cited by the applicants in the IDS submitted January 14, 2003).

Toshio teaches a specific example of a cooling roll having a width of 30 microns and a pitch (interval) of 16 microns (See the English language translation submitted by the applicants, paragraph 0015, line 8). Toshio does not explicitly disclose the ratio of the area of the grooves to the total area of the cooling roll, however the Examiner considers that the ratio of the groove width to the sum of the groove width and groove pitch is equivalent to the ratio of the area of the grooves to the total area of the cooling roll. Based on Toshio's example;

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{30}{16+30} = 0.65 \text{ or } 65\%$$

Thus, this example teaches a groove width of 30 microns and a ratio of the grooves to the total area of the cooling roll of 65% which are encompassed by applicants' claim 1, which recites a groove width of 0.5 to 90 microns and a ratio of the groove area to the total area of the cooling roll encompassed by the instant claims value of 30 to 99.5%.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 3, 5 to 8, 13 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Toshio** as applied to claim 1 above, and further in view of Fukuno et al. (**Fukuno**, US Patent No. 5,665,177).

Toshio teaches a cooling roll for manufacturing a ribbon shaped metal alloy material wherein the cooling roll has a grooved surface. Toshio teaches that the grooves are 0.1 to 50 microns wide and have a depth of about 10 microns or more. Toshio teaches that the groove width of 0.1 to 50 microns is such that the molten metal does not enter the groove (paragraph 0013, line 1 of the English language translation submitted by the applicants). Toshio teaches a groove pitch (interval) of 200 microns or less (paragraph 0014, line 4). Again, Toshio does not explicitly disclose the ratio of the area of the grooves to the total area of the cooling roll, however the Examiner considers that the ratio of the groove width to the sum of the groove width and groove pitch is equivalent to the ratio of the area of the grooves to the total area of the cooling roll.

Taking a sampling of groove widths and groove pitches taught by Toshio:

Groove Width = 50 microns

Groove Pitch = 10, 60, 80, 100 and 200 microns

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+10} = 0.83 \text{ or } 83\%$$

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+60} = 0.45 \text{ or } 45\%$$

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$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+80} = 0.38 \text{ or } 38\%$$

$$\frac{\text{Grove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+100} = 0.33 \text{ or } 33\%$$

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+200} = 0.20 \text{ or } 20\%$$

Thus, Toshio teaches ratios of the area of the grooves to the total area of the cooling roll that overlap the ratio of the area of the grooves to the total area of the cooling roll of 30 to 99.5% recited in applicants' claims.

Fukuno teaches a cooling roll for manufacturing a ribbon shaped metal alloy material wherein the cooling roll has a grooved surface. Fukuno teaches that to minimize variation in the crystal size of the product, that is, to make a more uniform product, the cooling roll is preferably comprised of a base and a surface layer (column 6, lines 65 to 67). Fukuno teaches that the outer surface layer on the cooling roll should have a thermal conductivity lower than the thermal conductivity of the cooling roll base (column 7, lines 1 to 7) as recited in applicants' claim 3. Fukuno teaches a thermal conductivity of the cooling roll outer surface that overlaps applicants' claim 5 (column 7, lines 3 to 6). Fukuno teaches a cooling roll surface layer having a thickness of 10 to 100 microns (column 7, lines 18 to 20).

The claims and Toshio differ in that Toshio does not teach the exact same range for the groove width or the ratio of the area of the groove to the total area of the cooling

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roll, that a cooling roll comprised of a base and a surface layer nor do the references teach a thermal expansion coefficient as recited in applicants' claim 6.

However, one of ordinary skill in the art at the time the invention was made would have been considered the invention to have been obvious because Toshio teaches a groove width and a ratio of the area of the groove to the total area of the cooling roll that overlaps the values recited in the instant claims. A prima facie case of obviousness exists when the ranges of a claimed invention overlap the ranges disclosed in the prior art *In re Geisler* 43 USPQ2d 1365 (Fed. Cir. 1997); *In re Woodruff*, 16 USPQ2d 1934 (CCPA 1976); *In re Malagari*, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05. Further, one of ordinary skill in the art would have been motivated to modify Toshio's cooling roll to a cooling roll having a base and a surface coating so as to minimize the variation in crystal grain size and make the product more uniform as taught by Fukuno. Further, the determination of an appropriate thermal expansion coefficient for the surface layer of the cooling roll is considered well within the skill of one of ordinary skill in the art.

7. Claims 1, 10, 14 to 16 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartlett et al. (**Bartlett**, US Patent No. 4,865,117).

Bartlett teaches a cooling roll for manufacturing a ribbon shaped metal alloy material wherein the cooling roll has a grooved surface (Abstract and column 1, lines 50 to 55). Bartlett teaches that the average width of the land or ridge is 0.025 to 0.635 mm (25 to 635 microns) (column 1, line 65) which overlaps the average ridge width of 0.5 to 95 microns recited in applicants' claim 10. Bartlett teaches that the grooves are helical

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(column 3, line 20), that is, spirally wound as recited in applicants' claim 14. Bartlett appears to teach groove configurations that overlap the groove limitations recited in applicants' claims 15 and 16 (column 3, lines 38 to 55). Bartlett teaches that the ratio of the average land width to the average groove width is about 0.5 to 1.5 (column 3, lines 49 to 51) or

$$W_L/W_G = 0.5 \text{ to } 1.5$$

wherein

W_L is the land width and

W_G is the groove width

and

$$W_G = W_L / 0.5 \text{ to } W_L / 1.5$$

$$W_L = 0.025 \text{ to } 0.635 \text{ mm (25 to 200 } \mu\text{m)} \text{ (column 3, lines 45 to 46)}$$

therefore the maximum W_G is

$$W_G = 0.635 / 0.5 = 1.27 \text{ mm or } 1270 \text{ microns}$$

and the minimum W_G is

$$W_G = 0.025 / 1.5 = 0.0167 \text{ mm or } 16.7 \text{ microns}$$

Thus, Bartlett teaches a groove width of 16.7 to 1270 microns and a land width of 25 to 200 microns.

Bartlett does not explicitly disclose the ratio of the area of the grooves to the total area of the cooling roll, however the Examiner considers that the ratio of the groove width to the total of the groove width and land width is equivalent to the ratio of the area

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of the grooves to the total area of the cooling roll. Taking a sampling of groove widths and land width taught by Toshio:

Groove Width = 50 microns

Land Width = 10, 60, 80, 100 and 200 microns

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+10} = 0.83 \text{ or } 83\%$$

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+60} = 0.45 \text{ or } 45\%$$

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+80} = 0.38 \text{ or } 38\%$$

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+100} = 0.33 \text{ or } 33\%$$

$$\frac{\text{Groove Width}}{\text{Groove Width} + \text{Groove Pitch}} = \frac{50}{50+200} = 0.20 \text{ or } 20\%$$

Thus, Bartlett teaches a groove width of 16.7 to 1270 microns which overlaps the groove width of 0.5 to 90 microns recited in applicants' claim 1 and ratios of the area of the grooves to the total area of the cooling roll that overlap the ratio of the area of the grooves to the total area of the cooling roll of 30 to 99.5% recited in applicants' claims.

The claims and Bartlett differ in that Bartlett does not teach the exact same values for the groove width and ratio of the area of the grooves to the total area of the cooling roll that overlap the ratio of the area of the grooves to the total area of the cooling roll as recited in applicants' claims.

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However, one of ordinary skill in the art at the time the invention was made would have been considered the invention to have been obvious because Bartlett teaches a groove width and a ratio of the area of the groove to the total area of the cooling roll that overlaps the values recited in the instant claims. A prima facie case of obviousness exists when the ranges of a claimed invention overlap the ranges disclosed in the prior art *In re Geisler* 43 USPQ2d 1365 (Fed. Cir. 1997); *In re Woodruff*, 16 USPQ2d 1934 (CCPA 1976); *In re Malagari*, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

8. Claims 2, 3, and 5 to 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bartlett** et al. as applied to claims 1, 10 and 14 to 16 above, and further in view of Fukuno et al. (**Fukuno**, US Patent No. 5,665,177).

Bartlett teaches and is applied as set forth above.

Fukuno teaches a cooling roll for manufacturing a ribbon shaped metal alloy material wherein the cooling roll has a grooved surface. Fukuno teaches that to minimize variation in the crystal size of the product, that is, to make a more uniform product, the cooling roll is preferably comprised of a base and a surface layer (column 6, lines 65 to 67). Fukuno teaches that the outer surface layer on the cooling roll should have a thermal conductivity lower than the thermal conductivity of the cooling roll base (column 7, lines 1 to 7) as recited in applicants' claim 3. Fukuno teaches a thermal conductivity of the cooling roll outer surface that overlaps applicants' claim 5 (column 7, lines 3 to 6). Fukuno teaches a cooling roll surface layer having a thickness of 10 to 100 microns (column 7, lines 18 to 20).

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The claims and Bartlett differ in that Bartlett does not teach a cooling roll comprised of a base and a surface layer nor do the references teach the thermal expansion coefficient as recited in applicants' claim 6.

However, one of ordinary skill in the art at the time the invention was made would have been motivated to modify Bartlett's cooling roll to a cooling roll having a base and a surface coating so as to minimize the variation in crystal grain size and make the product more uniform as taught by Fukuno. Further, the determination of an appropriate thermal expansion coefficient for the surface layer of the cooling roll is considered well within the skill of one of ordinary skill in the art.

Double Patenting

The provisional obviousness-type double patenting based on the claims of copending Application No. 09/833,806 has been overcome by the terminal disclaimer submitted August 25, 2003.

Allowable Subject Matter

9. Claims 33 to 37 are allowed.

10. Claims 4 and 30 and 32 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

I. Regarding claims 33 to 37, the primary reason for the indication of allowable subject matter is that none of the references alone or in combination teach or suggest a cooling roll as recited in claim 33 comprising a plurality of ridges provided by at least two spiral grooves having different directions so that the grooves intersect on the circumferential surface of the cooling roll, wherein the grooves have an average width of 0.5 to 90 microns to prevent a molten alloy of the magnetic material to be cast from entering the groove.

II. Regarding claim 4, the primary reason for the indication of allowable subject matter is that none of the references alone or in combination teach or suggest a cooling roll having a plurality of ridges provided by grooves having an average width of 0.5 to 90 microns to prevent a molten alloy of the magnetic material to be cast from entering the groove wherein the outer surface of the cooling roll is formed of a ceramic.

III. Regarding claims 30 and 32, the primary reason for the indication of allowable subject matter is that none of the references alone or in combination teach or suggest a cooling roll having a plurality of ridges provided by grooves having an average width of 0.5 to 90 microns to prevent a molten alloy of the magnetic material from entering the groove wherein the cross section of the grooves is square shaped or round shaped as recited in claims 30, and 32 respectively.

Response to Arguments

12. Applicant's arguments filed August 25, 2003 have been fully considered but they are not persuasive.

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Applicants argument that, "Toshio does not teach a plurality of ridges that are provided by forming a plurality of grooves at an angle less than or equal to 30^0 relative to an edge of the cooling roll wherein each ridge includes a plurality of discreet, spaced apart regions" is not persuasive. The grooves on Toshio's cooling roll are disclosed as at an angle of greater than 0^0 to less than 90^0 (see the English language abstract and paragraph 0012). Thus Toshio teaches a groove angle that encompasses the instantly claimed angle of "less than or equal to 30^0 ". Further, Toshio's Figures a, b and c teach a plurality of grooves that form a plurality of ridges as recited in the instant claims. Regarding the limitation, "wherein each ridge includes a plurality of discreet, spaced apart regions" it is the Examiner's position that as set forth above in this Office action the meaning of this language is not clear and therefore cannot be considered as distinguishing over the prior art.

Bartlett teaches that the grooves on the disclosed are helical (column 3, line 20), that is, spirally wound. In view of the fact that Bartlett's grooves are spirally wound, the grooves on Bartlett's cooling roll are at an angle to an edge of the cooling roll as recited in applicants' claims. Bartlett does not limit the angle of the grooves to the edge of the roller and therefore Bartlett is considered to encompass any angle including an angle of "less than or equal to 30^0 " as recited in applicants' claims.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

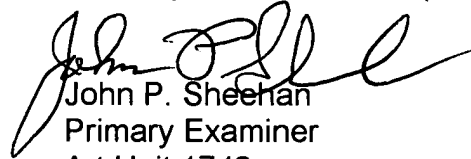
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A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John P. Sheehan whose telephone number is (703) 308-3861. The examiner can normally be reached on T-F (6:30-5:00) Second Monday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (703) 308-1146. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.


John P. Sheehan
Primary Examiner
Art Unit 1742

jps